Final Report

Food Waste Diversion in Schools

Contract Number IWM-C9061D

West Contra Costa Integrated Waste Management Authority

June 30, 2001

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Introduction

This project addressed the problem of food waste in schools through a pilot program at Peres Elementary School in Richmond. The school is part of the West Contra Costa Unified School District (District). Food waste disposal was reduced at the school through source reduction and recycling. Biodegradable utensils were collected for composting offsite, along with leftover food, milk cartons and soiled paper. Whenever possible the aluminum containers provided with individual lunches were wiped clean and recycled. The project was a joint effort between the local school district and waste management authority, which have been successfully collaborating for the past two years on a District-wide paper and container recycling program.

The West Contra Costa Integrated Waste Management Authority (Authority) is a public agency serving the municipalities of El Cerrito, Hercules, Pinole, Richmond and San Pablo as well as the unincorporated areas of West Contra Costa County. The Authority provides leadership and guidance to the residents, businesses, institutions and public agencies of West Contra Costa County in reducing the amount of waste disposed in the region and effectively managing the Household Hazardous Waste generated in the region. The Authority also oversees the operations and cost of the Integrated Resource Recovery Facility. The Authority was established in 1990 in response to AB939

The West Contra Costa Unified School District (District) serves West Contra Costa County, including the Cities of El Cerrito, Hercules, Pinole, Richmond and San Pablo. The District is the 18th largest local education agency in California and serves over 31,000 students from kindergarten through grade 12 as well as adult education. Over 70 languages are spoken within the 110 square miles of West County. The 39 elementary schools, five middle schools, five high schools and nine alternative schools offer a secure environment that encourages critical thinking and the free exchange of ideas. The District's Adult Education program provides academic, parenting, career and language skills, as well as counseling to an economically and ethnically diverse community. All schools in the District participate in the Authority sponsored school recycling program and divert a significant amount of waste. Recycling Coordinators have been designated in every school to assist in implementing the District-wide recycling program. These principals and teachers have volunteered their time to help set-up and promote the program and were selected because of their commitment to recycling and waste reduction.

Peres Elementary School is located in Richmond and has about 600 students in kindergarten through sixth grade. The student body is very diverse and primarily of low income. This school was the first in the District to receive a Healthy Start grant. Most students receive a free lunch at school and many receive a free breakfast as well.

The school has a garden, in which many students, teachers and community members actively participate. Finished compost from the composting facility is donated to the school

on request. Staff and students can see the results of their recycling efforts applied to the garden and witness a closed-loop system.

Nearly all the students at Peres School eat a school lunch. These lunches are prepared at a Central Kitchen off-site because District schools no longer have a kitchen or dishwashing facilities. The meals are pre-packaged at the Central Kitchen into single servings wrapped in plastic film, placed in rigid plastic containers or sometimes placed in an aluminum tray wrapped in plastic film. Milk is served in small individual cartons.

Methods

Materials

Posters were designed, printed and laminated. (Copies are attached in Appendix A.) The posters were hung in the cafeteria to remind students how to sort their lunch. The Recycling Monitors wore vests to identify them and give them a sense of pride in the program. (A mock-up of the vests and photos is in Appendix A.) The Authority chose to produce vests, rather than t-shirts, because students could put them on and remove them more easily and were less likely to forget to remove them after the lunch hour. The "recycling team" depicted on the vests and posters was the same one used to promote classroom recycling in the schools on colorful folders (see enclosed example) given to all the students. The students recognized these characters and associated them with school recycling.

The local hauler donated collection containers and lids for the compostable materials. Biodegradable bin liners and utensils were purchased from Biocorp. Staff at Biocorp was particularly helpful in accommodating our specific needs. They have worked on similar projects with schools in the past and are very willing to help. A special biodegradable "spork packet" was designed to replace the packet students usually receive with their lunch. The packet consists of a biodegradable "spork" (spoon and fork hybrid), straw and napkin in a biodegradable film casing. Using the packet has alleviated the need to purchase two separate utensils (spoon and fork), thereby reducing waste. The packet has also helped with hygienic concerns about students handling an unpackaged utensil. During the assemblies, students were taught that the new packet and its contents are made of starch and are biodegradable unlike the old plastic version.

After a few weeks, Biocorp introduced a new product, a green film containing recycled plastic that is biodegradable. Authority Staff were excited that the product is green because it could be easily differentiated from the other non-biodegradable plastics in which the lunches were packaged. Therefore, spork packet wrappers could be placed in the yellow food waste bins rather than the garbage. (A sample is enclosed in Appendix A.)

A small platform scale was used to weigh the material on-site. A front-loader scale had been proposed for this purpose, however it was determined at the beginning of the project that such as scale could not work. The hauler could not collect the food waste in a front-loading bin and therefore could not weigh the material using this device. The platform scale was more practical and significantly less expensive.

Staff

Only one teacher at Peres School, Linda Franke, was willing to participate in the project. Four other teachers agreed to assist only when she was absent or called away from

school during lunch. Yet, when the time came, they refused to help. Finally, Assistants were hired to help with the project and paid for their time.

In the early stages of the project, the lead Custodian was uncooperative and unsupportive. He had a set routine by which he removed waste and cleaned the cafeteria in the short timeframe between lunch periods. He was upset by the disturbance and refused to provide any assistance. The additional bins were in his way and he was unwilling to wait for the Monitors to weigh the materials in between lunch periods because he needed to remove the garbage and re-line the bins quickly. He had only a few minutes before the next group of students entered the cafeteria. After much pleading, he has agreed to allow one weighing per week, and slowly became more cooperative as he realized that the program was not creating additional work for him, but just the opposite.

After a few months, the lead Custodian was transferred to another school and another Custodian took his place. The new Custodian was extremely supportive of the program from the start. He believed the program made his job easier and was important for the students because it gave them a sense of responsibility and self esteem. He became very involved and was also paid for his help with the project.

Authority Staff initially went to the school every day to assist with this program. Visits were gradually reduced from five to one per week.

Training

Initially, there was great difficulty in recruiting and training students to be Recycling Monitors. The goal was to train 15 Monitors per lunch period. This would allow for three groups of five students to act as monitors, each only twice a week. Teachers were asked to request volunteers in their classrooms and to select two volunteers per class. The two volunteers were given permission slips to take home for signature by their parents allowing them to participate in a two-day after school training series. Very few returned their permission slips and were able to participate. A few days before the training began, word came that a new principal would be coming to the school in a few weeks. Fortunately, he was supportive of the program.

The Recycling Monitors were trained and an assembly was held for each lunch period in which the Monitors demonstrated the new waste separation process and assisted in training the other students. As there were two lunch periods, one for upper and one for lower grades, two sets of students served as monitors. A set of third grade students monitored the first lunch period and a set of fifth grade students monitored the second period. The Monitors composed rap songs and sang them while showing their classmates how to separate waste at each station: liquid, food waste, recycling and garbage. (See copy of lyrics in Appendix A.) Teachers were given the lyrics prior to the assembly so their students could practice and sing along. The teachers also received an evaluation sheet to estimate the volume of garbage currently generated by the school at lunchtime. This helped to reinforce the importance of the project.

A total of about 30 Monitors (see photos in Appendix A) assisted with the lunchtime separation and collection and several other students expressed interest in participating. Food waste was collected daily from both lunch periods and weighed weekly. In the beginning, Staff was unavailable at the school to supervise the breakfast period and therefore no separation of breakfast waste occurred. However, in the last few months, additional Staff became available to help separate the breakfast waste as well.

Monitors were also trained to collect unopened food packages from students who would otherwise throw them away. Cafeteria Staff had a system to donate leftover unopened food items to local community members. Unfortunately they kept no records of the amount of food donated and therefore no data exists on the diversion attributable to these waste reduction efforts.

The first day of waste separation with the younger students was chaotic. The students were very confused and even the Monitors who had been well trained, forgot how to separate the waste. The short lunch periods did not allow time for students to line up and move through the waste stations, one by one. Instead, the students all rushed at the Monitors and Staff asking what to do.

The principal observed this first day of chaos and very patiently and encouragingly suggested that the process be introduced one step at a time, giving the students three or four days to get used to each step. His suggestion was excellent. Unfortunately, winter recess was only a week away and it did not make sense to begin this slow training process only for the students to forget while on holiday for two weeks. Therefore the project was postponed until early January.

On January 8th, the program officially began. The first through third graders were initiated slowly with just the separation of liquids, milk cartons and juice containers to start. They poured any remaining liquid into a bucket and then placed their milk cartons and paper juice pouches into the yellow bins. Sporks, napkins and straws were also encouraged into the yellow bin. After several days, the food waste was also placed in the yellow bin. Finally, aluminum trays, cans and bottles were collected in the recycling bins.

The fourth through sixth graders began the program all at once. The first day, too much plastic found it's way to the yellow bins for them to be processed. They were disposed with the garbage. The second day, however, the material was clean enough for processing at the compost facility. Linda came up with the excellent idea to have students remove all plastic packaging from their lunch as soon as they sat down. Then, when students discarded their remaining lunch items, there was less confusion and separation of materials needed and much less plastic was placed in the yellow bins.

Measurement

Initially, it was hoped that data collection could occur daily. However, once the program began, it was quickly realized that this was not feasible. Thus, measurement of the weight of material collected was taken only once a week on the day that Authority Staff was available to assist. The following categories of weight were measured: food waste, recycling and garbage. Monitors recorded the information on a data sheet under the supervision of Authority Staff. (See enclosed sample data sheet.) Authority Staff entered this data into a spreadsheet and estimated the percentage of material diverted by the program.

Authority Staff had also hoped to collect information about foods provided in excess to the school. This information could then be compiled for the Central Kitchen Staff. However, it was quickly determined that the Monitors would record their personal impressions of the food served and not the overall impressions of all students. Additionally, the lunch hour was far too hectic for Staff to observe and record this information. They were far too busy with simply overseeing the sorting of materials.

Collection

Collection of the food waste occurred three times a week. The material was collected in a pick-up truck, weighed and taken to the compost facility. The material was mixed with residential yard waste and placed in a windrow at the compost facility.

We had hoped to reduce the frequency of collection after time, but the material was stored indoors after school hours due to the threat of vandalism and could not be kept longer than two days due to odor and lack of space. The bins were frequently hand-washed and wiped clean by Staff to prevent odor, especially from sour milk.

Data

Charts of the recorded data are included in Appendix B of this report. For the first nine weeks of the program, only about 40% of the cafeteria waste by weight was diverted. However, later in the program, the diversion rate jumped to about 70% due to the new assistants who would sort through the material at the end of the lunch hour to clean up the food waste bins and remove any food waste or other compostables from the garbage.

There is evidence of source reduction due to the project in addition to recycling diversion. Baseline data from the two weeks prior to the program start date show approximately 250 pounds of cafeteria waste disposed daily. However, this weight decreased by about 100 pounds once the program began due to increased awareness among staff and students and an effort to collect unopened food items for reuse.

Expenditures

A table summarizing expenditures billed to the Board and those covered by the Authority is included in Appendix B. The Authority has completed the project significantly under budget.

Conclusions

The methods to reduce cafeteria food waste described in this report are not sustainable and are not worth repeating. The project was extremely labor intensive and very expensive. Without funding, the project could not continue.

Linda Franke, the teacher at Peres School, was very patient and sacrificed a great deal of time and effort into the project. If she had not been personally devoted to waste prevention, it is doubtful that she would have been willing to commit her time and energy to this capacity. She was not teaching in the classroom this year as she was assigned to curriculum development and teacher training, making her schedule more flexible. As she was not working with students all day like the other teachers, she was willing to sacrifice her lunch break to supervise the Monitors. This was an unusual situation, unlikely to be found in other schools.

Since no other teachers or school staff members were willing to volunteer time to this project, additional staff had to be paid to help at the school. Linda was also paid to reward and encourage her continued dedication. The personnel portion of the project therefore

became very expensive. Additional labor was also required to manage, train and provide compensation to these assistants.

Student monitors were initially offered snacks by school staff as a reward for their participation. This became expensive and difficult to manage as students requested a snack every day after completing their work.

The biodegradable bin liners and utensils required for this project were expensive. An additional cost was the shipping of these items that was required once or twice a week due to the lack of storage space at the school. The utensils and their packaging confused students who were too young to fully comprehend the difference between these biodegradable products and other plastic packaging materials. Many utensils were placed in the garbage and a lot of plastic packaging was placed in the food waste bins due to this confusion.

One of the biggest contaminants to the food waste bin was the condiment packet. Virtually every meal was served with a packet of ketchup, mustard or syrup. Students would place it in their aluminum tray or when they finished eating and then dump it with their food into the food waste bin.

Some of the volunteers were so dedicated that they were willing to dig through every bin at the end of the lunch hour to remove contamination from the food waste and recycling bins and ensure that all compostable and recyclable waste was removed from the garbage. Student monitors helped with this as well, but when the other students became aware that this was happening, they stopped taking the time to sort their waste. Thus, all of the education and training of the students was lost.

The sorting process was too complex and difficult for adults let alone elementary school students. The time frame given to students to sort materials was also insufficient. Students were dismissed in groups of 30 to 50 and were in a hurry to leave the cafeteria to go to recess. They had no trays to hold their lunch and had difficulty holding everything and separating the materials into the different bins. Often it was difficult for students to open packages and separate, for example, the plastic wrapper from the aluminum tray.

Recycling aluminum trays was very time consuming and labor intensive as each one had to be stripped of any remaining plastic wrap, wiped clean and stacked to conserve space in the recycling bin. Student monitors helped with this task, but could rarely finish the job before the end of the lunch hour. The adult recycling assistants were required to complete the task.

The milk cartons sent to the composting facility did not break down well and created a lot of litter at the site. The biocorp packaging and utensils decomposed more readily, but still very slowly. These materials would have better decomposed if they had been shredded and composted in an in-vessel system instead of simply being placed in windrows and exposed to the elements.

Recommendations

Future attempts to reduce waste at school sites should focus on packaging. The process of separating food waste from the plastic packaging in this project was extremely labor intensive and not sustainable. Contamination of the food waste with plastic was a continual problem and the bins required a second round of sorting after the initial separation of materials.

The Authority recommends two possible scenarios for further investigation:

1) Provide funding to schools to support reuse of trays and utensils in the cafeteria. If schools are provided with dishwashing equipment, reusable trays and utensils and additional staff to wash these items, it can be demonstrated that they will save money in the long run by reducing waste disposal costs and packaging costs.

Students would be served food directly on the compartmentalized trays. The food would still be prepared at the central kitchen and placed in reusable metal trays for delivery to satellite schools. The trays could be washed at the school and given back to central kitchen staff the next day. Food waste could be collected in buckets and taken back with the clean trays by central kitchen delivery trucks to be composted off-site.

Serving milk in a cup, however, is impractical as it would be likely to spill. A solution is to provide milk in single-serving recyclable plastic bottles. Such packaging is currently available commercially and is a feasible alternative to the milk carton, which is difficult to compost.

2) Provide funding to schools to support the use of biodegradable packaging and composting of all un-sorted cafeteria waste in an in-vessel system. Biocorp is currently testing bio-degradable rigid plastic containers for use in food service. Once available, these containers could be substituted for the aluminum trays and plastic containers currently used at schools. Thus, all material from the school lunches could be composted either on-site or at a central location.

Either of the two scenarios requires District-wide participation in order to be feasible and sustainable. Linda Franke sent a letter to the Board of Education explaining the benefits of a cafeteria recycling program and requesting that the program be made available District-wide. (A copy of the letter is enclosed in Appendix A.) Clearly there is interest from school staff and students to reduce waste. With new legislation from the State requiring that schools reduce their waste, this interest will only increase. Significant waste reduction in schools is possible, but funding and assistance from the State and local jurisdictions is necessary to start these programs and demonstrate their ease, sustainability and educational value.

Appendix A

RECYCLING MONITORS!

Recycling Monitors in Action

Recycling Monitor Training

Recycling Monitors

Linda Franke and Kimo, Custodian

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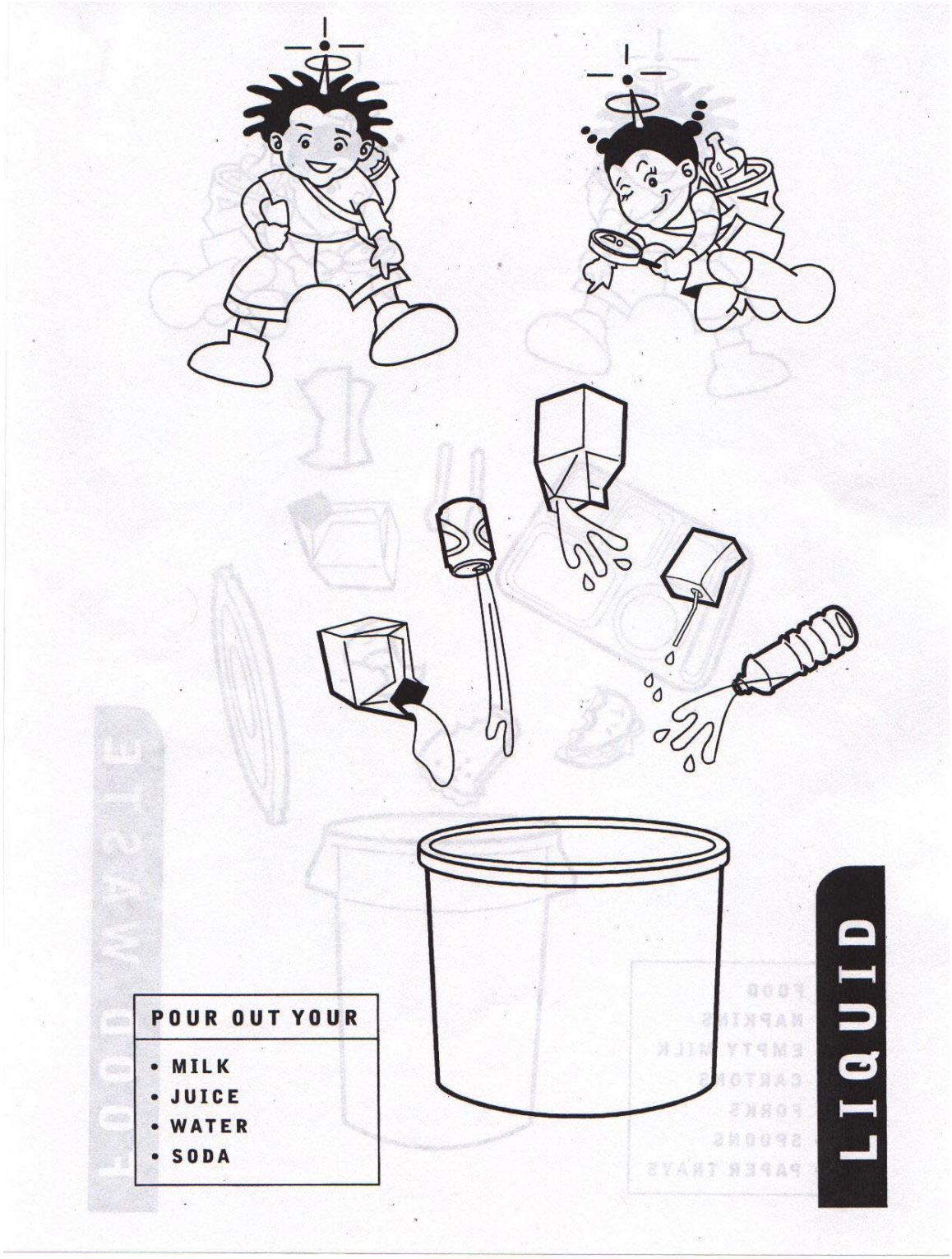
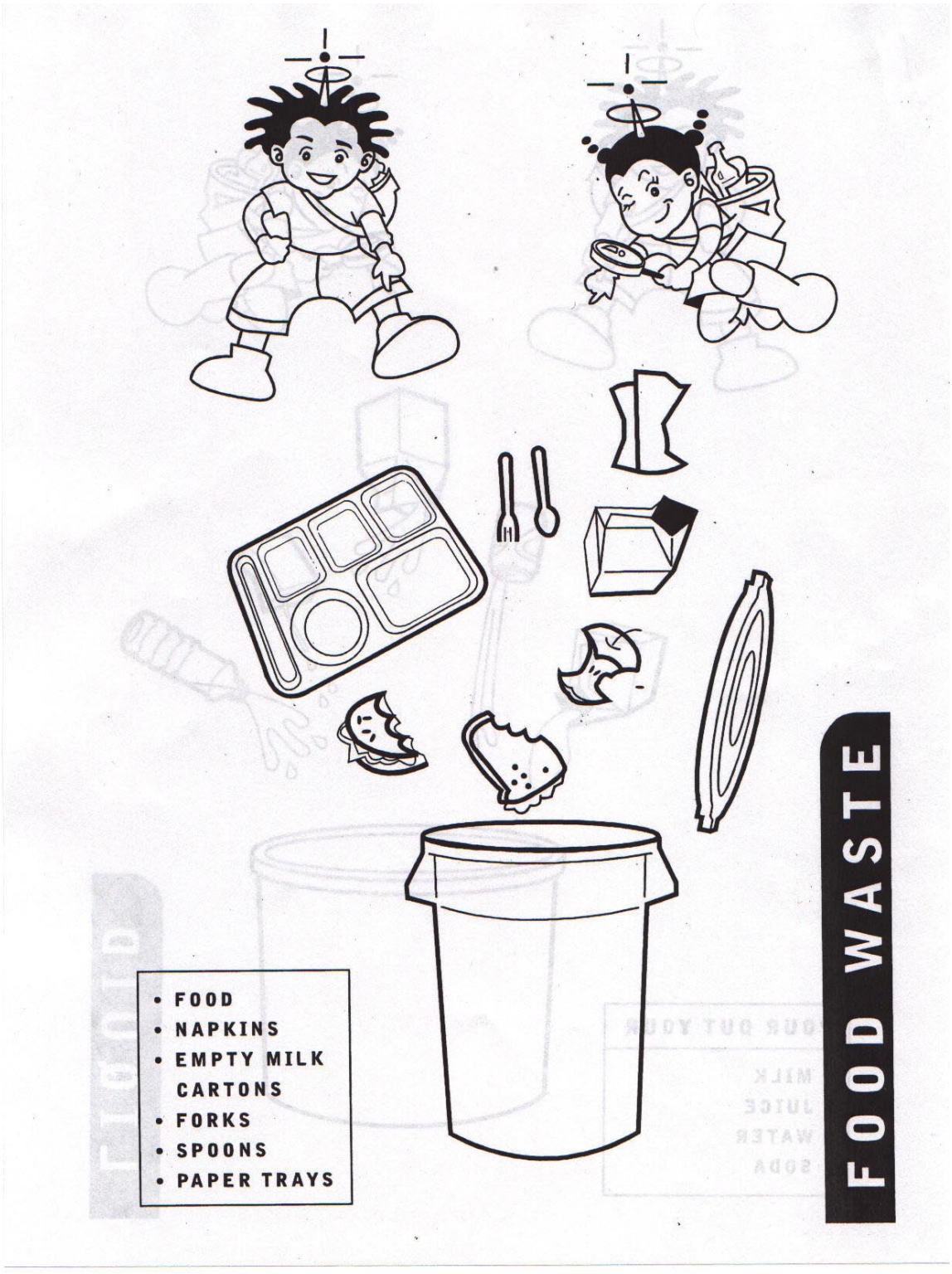
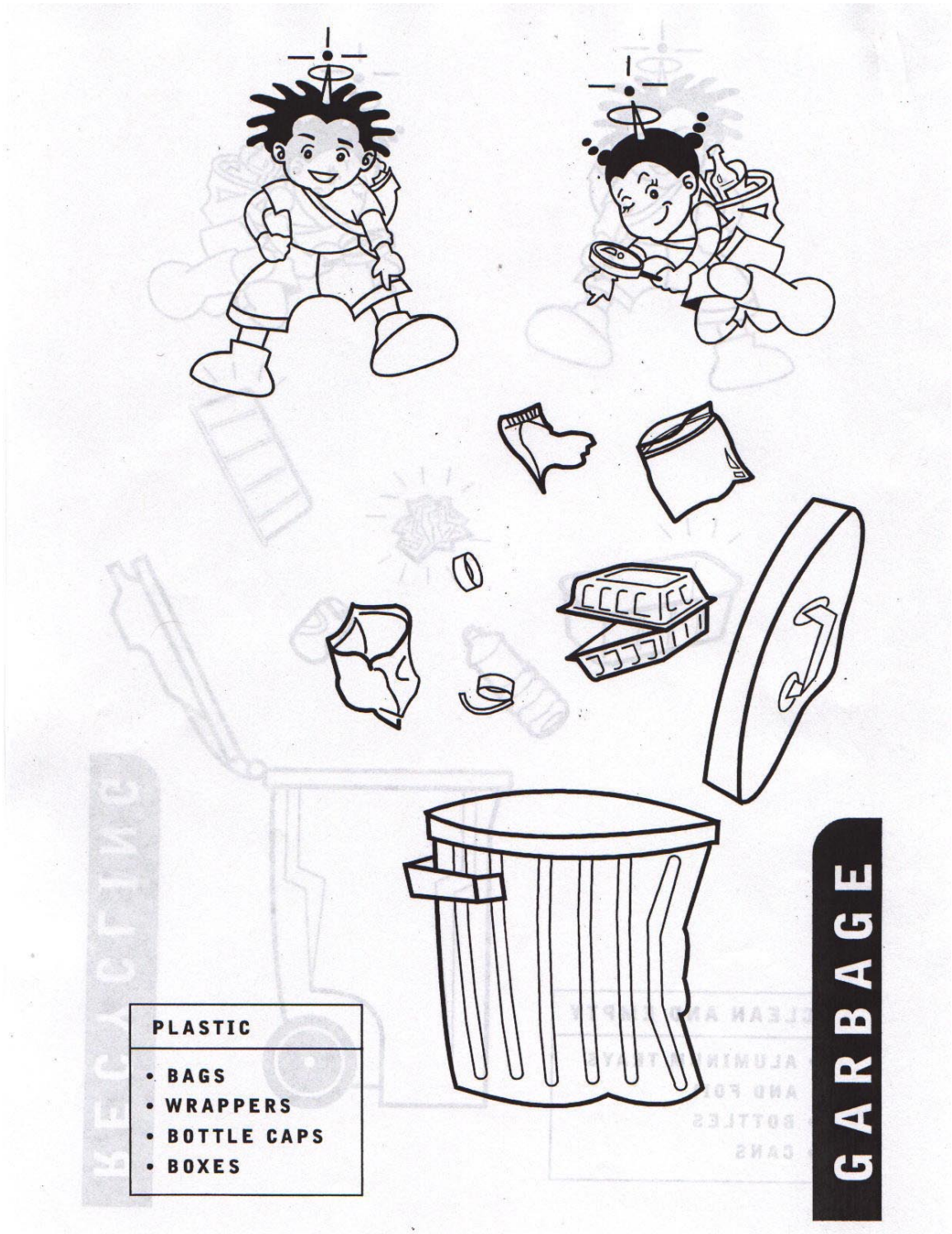



FOOD WASTE
• FOOD
• NAPKINS
• EMPTY MILK CARTONS
• FORKS
• SPOONS
• PAPER TRAYS


RECYCLING
CLEAN AND EMPTY
• ALUMINUM TRAYS AND FOIL
• BOTTLES
• CANS


GARBAGE
PLASTIC
• BAGS
• WRAPPERS
• BOTTLE CAPS
• BOXES

Peres School Cafeteria Recycling Project Data Sheet

_____ _____

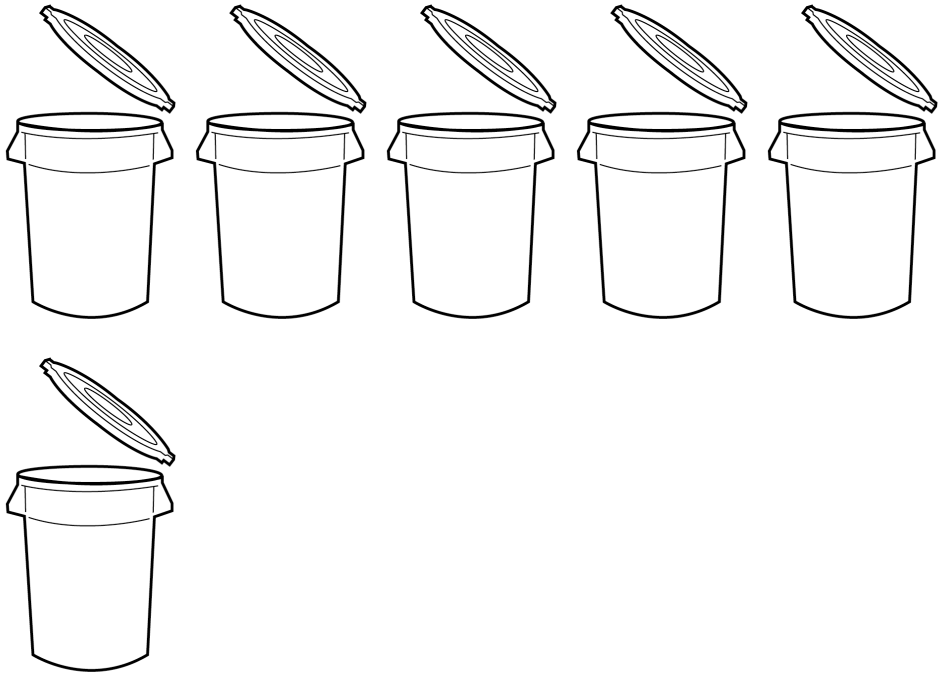
_____

Date Period Breakfast/Lunch

_____ _____ _____

Name Grade Teacher

Color in each bin to show how full it is. Write the weight underneath each bin.



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April 18, 2001

West Contra Costa Board of Education

Dear Board,

It has been a privilege to work with the Integrated Waste Management Authority at Peres Elementary School this school year to pilot a cafeteria recycling and composting project. The project involved training thirty, third-sixth grade students as monitors. Students were recommended by their teacher, and will permission of their parents trained after school by a representative of the IWMA. I was able to collaborate with custodial and cafeteria staff and to inform students and teachers of the project goals. This fall an average 250 pounds of garbage daily was going to the landfill. This winter we diverted approximately 45 % per day to a composting system by recycling during noon lunch periods. In March we began to include breakfast and Kindergarten lunch, which has increased the divertion from the landfill to 60%. The cafeteria recycled recources now go to a composting facility. This percentage is higher than the county average for residential and commercial projects.

Among the most rewarding aspects of the project beside the remarkable progress, has been a partnership with the Integrated Waste Management Authority through Nicole Angiel, Project Coordinator. Nicole was there to trouble shoot and provide expertise all along the way. She attended all the training sessions and came by once a week to weight all the garbage. The 30 students who volunteered to help with the collections have received a better understanding of working toward solutions through teamwork and responsibility, bringing hope to the waste problem while learning about data collection.

Although changing the way custodial and cafeteria staff work was a challenge, without exception each person has seen the value of recycling. Our current head custodian is a vocal advocate of the Pilot Program. "It makes my job so much easier!", he said recently. With his enthusiasm the cafeteria and custodial staff have all become intregal partners in the efforts of the students and their teachers.

I encourage you to consider the adoption of similar projects district –wide. I have seen children, parents, teachers and staff taking pride in Peres Elementary School by making this contribution to California's 50% waste reduction goals to landfills.

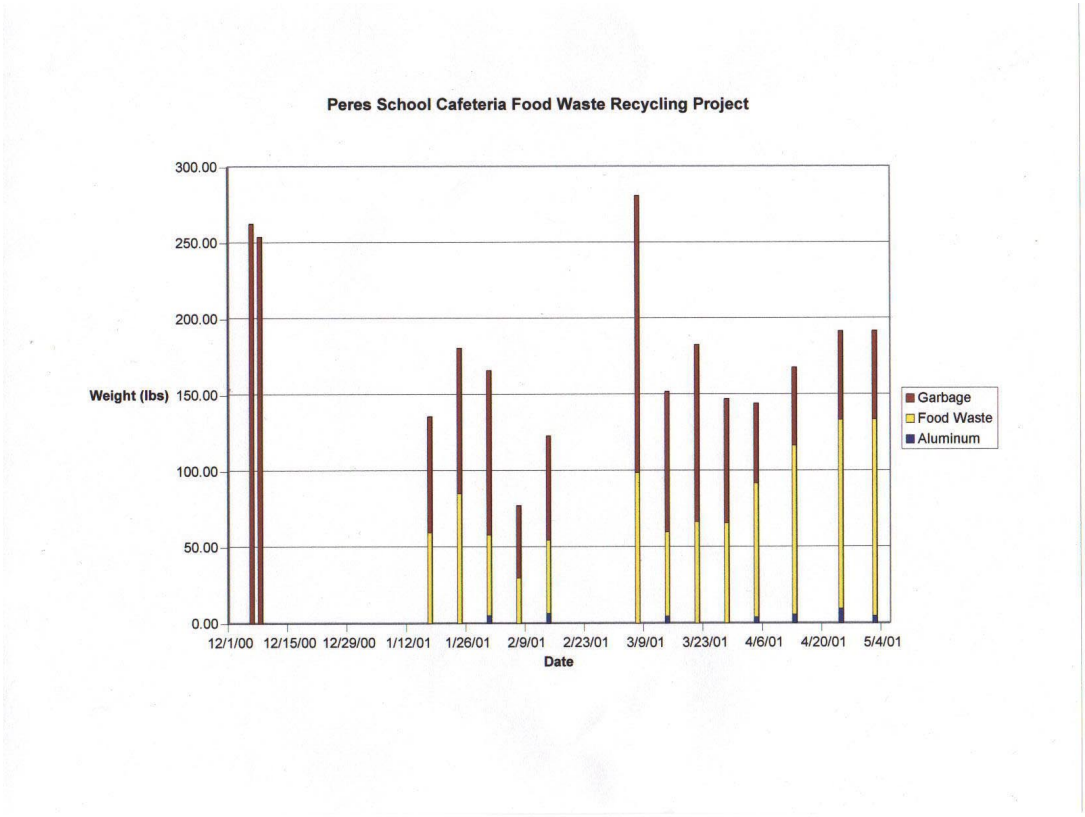
You are instrumental in making this a district-wide goal, giving back rich soil to the Earth rather than noxious garbage. Understanding the personal connection to the cycles of life, gives students a sense of hope about our future. Positive actions now will impact the quality of life for our children.

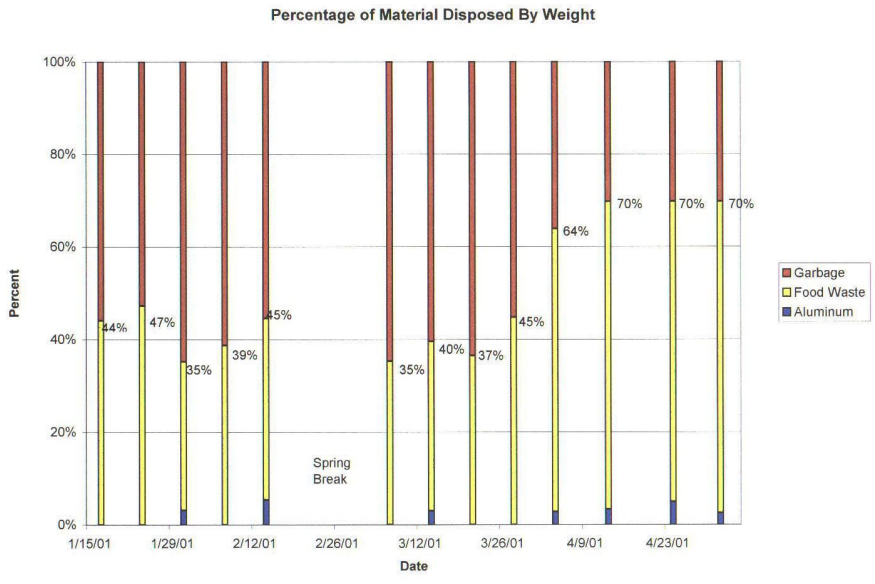
Please support this program with your consideration.

Respectfully,

Linda Franke, Curriculum Guide

Appendix B


Peres School Cafeteria Food Waste Recycling Project
Weight (lbs)
300.00
250.00
200.00
150.00
100.00
50.00
0.00
12/1/00
12/15/00
12/29/00
1/12/01
1/26/01
2/9/01
2/23/01
3/9/01
3/23/01
4/6/01
4/20/01
5/4/01
Date
Garbage
Food Waste
Aluminum


Percentage of Material Disposed By Weight
Percent
100%
80%
60%
40%
20%
0%
44%
47%
35%
39%
45%
35%
40%
37%
45%
64%
70%
70%
70%
Spring Break
1/15/01
1/29/01
2/12/01
2/26/01
3/12/01
3/26/01
4/9/01
4/23/01
Date
Garbage
Food Waste
Aluminum

Direct Expenses

Item	*Funds Requested*	Authority Funds	Board Funds	Balance
Recycling Vests/Poster Design	*$ 1,085.00*		$ 1,054.25	$ 30.75
Printing of 12 Vests and 10 Posters	*$ 434.00*		$ 275.90	$ 158.10
Biodegradable Utensils (Spork packet)	*$ 13,020.00*		$ 7,000.00	$ 6,020.00
Weekly shipment of Spork packets			$ 1,863.25	$ (1,863.25)
Biodegradable liners	*$ 543.00*		$ 875.08	$ (332.08)
Scale	*$ 16,275.00*		$ 640.00	$ 15,635.00
Brute Bins and Lids	*$ 543.00*		$ -	$ 543.00
Brute Dollies	*$ 380.00*		$ 349.70	$ 30.30
Incentives for Recycling Monitors/Staff	*$ 54.00*		$ 778.67	$ (724.67)
Mileage		$ 100.00		$ -
Total Direct Expenses	*$ 32,334.00*	$ 100.00	$ 12,836.85	$ 19,497.15

Personnel

Item	*Funds Requested*	Authority Funds	Board Funds	Balance
Authority Executive Director		$ 3,000.00		
Authority Recycling Manager		$ 32,000.00		
School Recycling Assistants			$ 5,722.50	$ (5,722.50)
Bus Driver (Recycling Field Trip)			$ 92.00	$ (92.00)
Driver (Collection of Material)	*$ 3,688.00*		$ 1,593.00	$ 2,095.00
Web Design	*$ 260.00*	$ 260.00		$ 260.00
Total Personnel	*$ 3,948.00*	$ 35,260.00	$ 7,407.50	$ (3,719.50)

TOTAL EXPENDITURES	***$ 36,282.00***	**$ 35,360.00**	**$ 20,244.35**	**$ 15,777.65**